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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/609,347	07/05/2000	Robin Cheung	AMAT/3421.C1/ISM/COPPER/D	5540

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APPLIED MATERIALS, INC.
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EXAMINER

SMITH HICKS, ERICA D

ART UNIT	PAPER NUMBER
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1741

15

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/609,347	Applicant(s) CHEUNG ET AL.	
	Examiner Erica Smith-Hicks	Art Unit 1741	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment filed 9-27-2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 19-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 19-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) ✓ | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) ✓ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>13</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to Applicants' amendment filed September 27, 2002.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. Claims 1-11 and 19-47 are pending with claims 21-23, 25, 29, and 35-37 amended and claims 12-18 canceled per Applicants' request

Terminal Disclaimer

2. The terminal disclaimer filed on September 23, 2002 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US 6,136,163 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Election/Restrictions

3. Claims 1-11 and 19-20 have been rejoined and prosecuted on the merits herein.

Claim Objections

4. Claims 19 and 20 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 19 and 20 depend from claim 18 which has been canceled per Applicants' request. Applicants' should amend claims 19 and 20 to depend from claim 1, or a preceding claim.

Claim Rejections - 35 USC § 103

5. Claims 1-11, 19-21, 22, 24, 26-30, 32, 37-40 and 42-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over MAYDEN et al. US 5,292,393 and TING et al. US 6,187,152 B1 and in further view of BAECKER et al., US 5,820,692.

MAYDEN et al. (hereafter MAYDEN) teach a multichamber integrated process system comprising a mainframe (see reference numeral 10, process system comprising a main frame, reference numeral 12 of Figures 1 and 2), as described in the reference at col. 4, lines 27-31; a loading station disposed in connection with the mainframe having one or more loading stations at col. 30, lines 31-35 and col. 5, lines 18-31.; and further the apparatus comprising one or more processing and post processing treatment chambers at col. 4, lines 28-32 and col. 8, line 65-col. 9, lines 1-19.

While MAYDEN teach the integrated apparatus comprising a chamber for deposition, and list various adaptations possible for the apparatus deposition tools common to semiconductor/circuit fabrication, the reference fails to expressly list electroplating/electrochemical chambers for the said deposition apparatus.

TING et al. and BAECKER et al. in combination teach the deficiency in MAYDEN.

TING et al. (hereafter TING) disclose a multiple processing treatment apparatus comprising one or more electrochemical baths at col. 3, line 65 through col. 5, line 5. BAECKER et al. (hereafter BAECKER) disclose a multichamber apparatus for performing wet and dry processing procedures at col. 5, lines 3-15 of the reference. In the BAECKER apparatus, a wet processing procedure for example rinsing with wet

Art Unit: 1741

chemicals such as hydrogen peroxide, hydrofluoric acid, hydrochloric acid, isopropyl alcohol, sulfuric acid and acetone may be performed on a substrate, (col. 5, lines 5-15); thereafter the treatment chamber may be evacuated and thereafter the substrate may be treated with a gas in a chamber of the apparatus (col. 4, lines 14-40).

MAYDEN, TING and BAECKER in combination thus disclose all of the limitations of independent claims 1, 21, 38 and 45. The references are combinable as they are from the same technology area of integrated processing apparatus.

It would have been obvious to a person of ordinary skill in the art to have modified the MAYDEN et al. integrated apparatus capable of wet and dry processing with the inclusion of an electrochemical deposition segment chamber as disclosed by BAECKER and TING because TING have shown where this type of deposition embodiment would have allowed for the plating benefits attendant with the functionally equivalent deposition technique of electroplating while maintaining a "closed system" that significantly reduces particulate contamination of the workpiece while undergoing treatment in a multi-process system and further BAECKER has shown that providing for an apparatus embodiment wherein treatment chambers can be adapted for first and second preselected pressures would have allowed for both wet and dry processing further advancing integrated tooling, reducing process time attributed to load/unload and transfer steps .

Claims 9-11, 22, 24 and 44 are rejected because the primary reference to MAYDEN teaches an embodiment wherein wafer transfer robots transfers the wafers

Art Unit: 1741

between one or more cassette receiving areas and cleaning and post-treatment areas as disclosed in the reference at col. 4, lines 32-50.

Claims 26-28 are rejected because the primary reference to MAYDEN discloses an embodiment wherein first and second treatment chambers are disposed on each side of a mainframe, as shown in Figure 1.

Claims 2-8, 19, 20 and 32 are rejected because the primary reference to MAYDEN discloses a deposition system comprising rapid thermal anneal chamber(s) at col. 2, lines 7-15 of the reference.

Regarding claims 29 and 30, although MAYDEN does not expressly teach one or more robot transfer arms, the duplication of parts was held to have been obvious under the holdings of *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). Moreover, the rearrangement of parts while maintaining the same function was held to have been obvious under *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950). Therefore claims 29 and 30 are rejected as obvious modifications of the MAYDEN embodiment.

Claims 37, 39, 40, 42, 43, 46 and 47 are rejected because the MAYDEN reference teaches a transfer of wafer cassettes through a cassette receiving and pass through area and to other treatment chambers associated with the mainframe in col. 2, lines 45-55; col. 4, lines 32-50 and col. 5, lines 1-31.

6. Claims 33-34 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the MAYDEN combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of POLAN et al. US4,568,431.

The MAYDEN combination is as applied, argued and disclosed above and incorporated herein.

While the MAYDEN combination teaches an electrolyte recirculation system (see Abstract), they fail to teach a replenisher for the integrated system.

This teaching is provided by POLAN et al. who disclose an integrated processing system comprising a means for replenishing the electrolyte, chemical analysis of the solution, a rinse tank in association with the replenishing system and the system further comprising filters in col. 3, lines 10-28; and in Fig. 2 of the reference.

It would have been obvious to a skilled artisan at the time of the invention to have modified the MAYDEN combination with the replenishing system disclosed by POLAN et al. because POLAN et al. have shown where the inclusion of the replenisher would have significantly enhanced the deposition surface of the wafer treated therein by optimizing control of the deposition solution consistency and removing impurities from the deposition solution, thus reducing surface anomalies caused by the associated impurities of untreated solutions. Still further, the replenishing/recirculation of solution would have been of cost benefit by reducing the amount of solution added to the baths, absent evidence to the contrary.

7. Claims 23, 25, 31, 35, 36 rejected under 35 U.S.C. 103(a) as being unpatentable over the MAYDEN combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of LLOYD et al. US 6,290,865.

The MAYDEN combination is as applied, argued and disclosed above and

incorporated herein.

While the MAYDEN combination teaches a rinse and dry process module, they fail to disclose an integrated SRD.

This teaching is provided by LLOYD at col. 4, lines 28-52 who disclose a SRD module as a widely art used embodiment for surface treatment of a wafer during integrated processing.

The MAYDEN combination and LLOYD disclose all of the limitations of the instant rejected claims and are combinable as they are from the same technology area of multi-treatment embodiments for semiconductor substrates.

It would have been obvious to a skilled artisan at the time of the invention to have modified the MAYDEN combination with a SRD module as taught by LLOYD because LLOYD have shown that the integration of a spin, rinse and dry module would have allowed for in-situ treatment of the wafer substrate thus reducing the risk of contamination associated with loading/unloading and wafer transfer to separate rinse and dry systems and would have also reduced the overall manufacturing costs by eliminating the required operator intervention associated with this loading/unloading.

Response to Amendment

8. The objection to the claims has been withdrawn in response to Applicants' amendment to renumber the claims in accordance with 37 CFR 1.126.

9. The objection to the Oath as defective has been withdrawn in view of Applicants' submission of a proper execution thereof.

Claim Rejections - 35 USC § 103

10. Claims 21, 22, 24, 26-30, 32, 37-40 and 42-47 were rejected under 35 U.S.C. 103(a) as being unpatentable over MAYDEN et al. US 5,292,393 and TING et al. US 6,187,152 B1. The rejection has been withdrawn in view of Applicants' arguments presented in response to an unofficial proposed response filed August 23,2002 and a new grounds for rejection has been made.
11. Claims 33-34 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the MAYDEN combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of POLAN et al. US4,568,431. The rejection has been withdrawn in view of Applicants' arguments and a new grounds for rejection has been made.
12. Claims 23, 25, 31, 35, 36 were rejected under 35 U.S.C. 103(a) as being unpatentable over the MAYDEN combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of LLOYD et al. US 6,290,865. The rejection has been withdrawn in view of Applicants' arguments presented in response to an unofficial proposed response filed August 23,2002 and a new grounds for rejection has been made.

Double Patenting

13. Claims 21, 32-36, 38, 41, 44 and 45 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 9 and 10 of U.S. Patent No. 6,136,163. The rejection has been withdrawn in view of Applicants' terminal disclaimer.

Response to Arguments


14. Applicant's arguments with respect to claims 21-47 have been considered but are moot in view of the new ground(s) of rejection. However, the Examiner notes her agreement with Applicants' argument presented during a telephone interview of 8/23/2002, specifically that the prior art disclosures of MAYDAN and TING alone do not suggest to one of skill in the art an apparatus for both wet and dry processing. Upon updating the search, the Examiner revealed the reference to BAECKER at all that provides this teaching. Accordingly, the Examiner respectfully disagrees that claims 1-11 and 19-47 distinguish over the teachings of the combined references applied herein.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erica Smith-Hicks whose telephone number is 703/ 305-7645. The examiner can normally be reached on Wed.-Fri., 8:00 a.m.-6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 703/ 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are 703/ 872-9310 for regular communications and 703/ 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703/ 308-0661.

ESH
November 29, 2002


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700